

# The Role of Digital Libraries in Enhancing the Knowledge Economy in Jordanian Universities

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## Abstract

This study aimed at revealing the role of digital libraries in enhancing the knowledge economy in Jordanian universities. To achieve this objective, the study instrument was constructed exemplified with a questionnaire, where the sample consisted of (19) items in final form. Having verified their validity and reliability, they were applied to a random sample of 370 students from three universities, namely: Yarmouk, Jordan University of Science and Technology and Al Albayt University in the northern region of the Hashemite Kingdom of Jordan. After applying the study instrument to the sample, the data were entered into SPSS programs for analysis, as the results revealed that there is an intermediate role for digital libraries in enhancing knowledge economies. On the other hand, the results revealed that there are no statistically significant differences due to gender and college variables in the role of Jordanian digital libraries in enhancing the knowledge economy in Jordanian universities from the students' perspectives. In light of the previous results, the researcher recommended the need to raise awareness about the significance of digital libraries in enhancing the knowledge economy. He also recommended that more studies be conducted on this subject through the application of other segments and comparing the results to achieve an integrated vision of the role of digital libraries in the service of knowledge economies.

**Keywords:** Digital Libraries, Knowledge Economy, Employing knowledge, Knowledge Production, Research Accessibility, Jordanian Universities.

## 1. Introduction

The technological explosion and the development of communications in line with the information revolution led to the existence of a digital information society, as libraries make

every single effort to develop and use modern technologies to provide information with all its available material and human resources.

Knowledge economies, in their general concept, is a kind of economic activity associated with knowledge and technology. (Barclay & Murray, 2002:3) define it as “studying and understanding the accumulation of knowledge and the incentives of individuals to discover, learn knowledge, and acquire what others know”. Tartar and Halimi (2011) assert “This economy is based on a new understanding of the role of knowledge in terms of its function, its use, its creativity and its innovation, relying on human capital to improve and progress the quality of life in all fields”.

Previous literature reviews, studies as well as researches (Al-Oqila, 2005; Reitz, 2006; Chowdhury & Chowdhury, 2003) almost confirm that the digital libraries are organizations that provide sources and are staffed by specialized personnel to acquire them, provide intelligent entry to achieve the publication, distribution, preservation and integration of these sources and ensure that it is permanently sustained in digital form and are therefore faster and easier to be used by university and colleges students.

On the other hand, the researcher believes that digital libraries are a positive investment of information and communication technology in all the functions and tasks of libraries, either in terms of the provision of various information channels or in terms of research and to get benefited from those references through the loan process in order to improve its performance and enhance its competitive position.

There is a close relationship between building digital libraries and promoting knowledge economies. For instance, The Arab Center for Educational Research for the Gulf States (2012) argues that knowledge economies have been associated with the creation of standards and mechanisms of digital libraries based on optimal use of education, reduction of financial, and human waste in technological education projects. Establishing economic educational standards that achieve mutual interest between the technological and educational sectors and raising awareness among educational institutions can be done through the optimal means of investment in technology. Additionally, the relationship between policy applied in education and practices which are consistent with the technological programming becomes significantly influential in the knowledge economies.

However, this is confirmed by many researchers (Areen, 2003; Diab, 2003; De Masi & Kodres, 2001) that the knowledge economy is primarily intended to increase considerably the growth of productivity average over the long term through the production, appropriateness, spread of information, and communication technologies.

In this regard, Powell and Snellman (2004) point out that digital libraries contribute to a range of services based on the diverse and focused activities that can be added to the creation and development of a knowledge society through greater reliance on intellectual capacities rather than on physical inputs or natural resources.

Due to the fact that there is a genuine relationship between digital libraries and knowledge economies alongside the results of previous studies, revealing that university libraries are

among the most widely used sources of information in the field of supply and loan, and in order to facilitate the utilization of the information channels available in these libraries, this study primarily intends to reveal the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the students' standpoints.

The topic and the issue of the relationship between digital libraries and knowledge economies is of great importance for contemporary societies, which seek to achieve the knowledge society in its entire dimensions due to its importance in optimizing the investment of resources. On the other hand, the need to use traditional means and methods in libraries has notably decreased, as those libraries shift to use modern technology in the completion of office work. The researcher as a current faculty staff has noted that the Jordanian university libraries are relentlessly seeking to modernize their office systems, and also noted the increase in the demand of students to take an advantage of these libraries.

As a fact, the significance of this study stems from the importance of the subject of digital libraries and the subject of knowledge economies as well. This study may substantially contribute to enriching the theoretical aspect of researches and studies that deal with the different roles of the subject of digital libraries throughout the current study's theoretical framework that may contribute to fill the shortage in the Arab library. Hopefully, the results of this study will effectively reveal the variables affecting the role of Jordanian digital libraries in enhancing the knowledge economy in Jordanian universities to rely on in evaluating this role. It is also hoped that the study will contribute to providing information that may help university libraries' curators to be aware of the strength and weak points of the role of those libraries in stimulating the knowledge economy in Jordanian universities in order to address the flaws and shortcomings which increase the effectiveness of this role.

Having reviewed the studies and researches related to the subject of the current study, it was confirmed that there were several studies being closed to the subject of the current study. The following is a presentation of such those studies:

Dvornik (2004) conducted a study aimed at identifying the nature of the current beneficiaries of digital libraries, where the researcher applied the study at four digital libraries and distributed a questionnaire to the staff of these libraries to answer questions concerning their management, to identify their objectives and the target audience from their perspectives. Similarly, the researcher designed a questionnaire targeting the audience of the current beneficiaries of these digital libraries to recognize their opinions and measure their satisfaction with the services provided, and then the researcher compared to what was achieved in order to answer the main question, namely: Is the current audience of beneficiaries as the same as audience targeted by digital library administrators? The study showed that the beneficiaries were from 37 countries around the world and large percentage of the beneficiaries was satisfied with their use of the digital library. On the other hand, the study showed some of the observations made by the beneficiaries, where the most important one lies in the need to introduce a larger quantity of full texts of information materials, the need to include more comprehensive topics, and not only historical articles and works that are not subject to rights of Intellectual Property (IP).

Parker (2005) conducted a study aimed at clarifying the research project of the digital library and meeting the general academic requirements, which is directly related to schools and different educational institutions, and is being full of valuable educational resources which can be used in classrooms. This library encompasses a digital catalog containing information on how to use it to maximize access and get more uses of it, where the library is designed at a high organizational level. It is also a multi-choice library and includes highly specialized areas.

Rooney (2005) conducted a study on knowledge, economics, technology and society regarding policy, theoretical documents, correspondences and understanding of knowledge, and found that this dominant discourse of knowledge is due to its ability to limit thinking and acting. The results of the study indicate that the considerably dominant discourse lies in the technocratic knowledge which is often influenced by political discourse and problem with a partial understanding of knowledge. For instance, what and how knowledge is organized in the work. Obviously, knowledge is a fundamental issue towards commercial and technological concerns.

Radwan (2006) conducted a study aimed to identify the degree of appreciation of faculty members at Yarmouk University as well as teachers of the secondary stage in Jerash governorate in Jordan for the role of information technology in the knowledge economy. The study sample consisted of 211 individuals, namely: 54 faculty staff, 80 male teachers and 70 female teachers. The researcher used a five-area questionnaire as follows: infrastructure, human resource development, law and order, motivation and banking systems. The results of the study showed that the role of information technology in the economy was high, and that there were statistically significant differences for the academic grade variable for the assessments of faculty staff and for the professor rank. The results of the study also showed that there were no statistically significant differences in teachers' assessments due to gender. Still, the results showed that there were statistically significant differences in the teachers' assessments attributed to the scientific and academic qualification and for the bachelor level.

Al-Smadi (2011) conducted a study aimed at knowing the degree of awareness of the students of Al-Balqa Applied University in the concepts of knowledge economy at the University of Balqa Applied. To achieve this goal, a questionnaire was constructed consisting of (24) items divided into five areas, namely: using technology in the university, the level of university building, the description of the university institution, the stimulators that help to move towards the knowledge economy and the assessment of the reality of transition to the knowledge economy. After its validity and reliability being confirmed, it was applied to a sample of (150) female students from Ajloun University College. The results showed that a medium degree of awareness possessed by female college students. The results also showed that there were no statistically significant differences due to the academic level and specialization variables.

Having shed the light on the previous studies, it is noted that these studies revealed the significance of the knowledge economy alongside the consequentiality of digital libraries. Still, these studies are limited to one variable (knowledge economy or digital library).

However, what distinguishes this study from other studies is its comprehensiveness for the subject, and it seeks to reveal the effect of the independent variable (digital library) from the dependent variable (knowledge economy) and thus the current study is considered as a key addition to previous ones because of its comprehensiveness in dealing with the topic.

Therefore, the study aimed at revealing the role of Jordanian digital libraries in enhancing the knowledge economy in Jordanian universities from the perspectives of students alongside shedding the light on the differences among the students' perspectives on the role of Jordanian digital libraries in enhancing the knowledge economy in Jordanian universities according to the difference of gender and college variables. This study aims to answer the following questions:

1. What is the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the perspectives of students?
2. Are there statistically significant differences at the level of ( $\alpha \leq 0.05$ ) in the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the points of view of students according to the difference of gender and college variables?

### *1.1 Terminologies of Study*

The study included the following terms:

**Digital Library:** it is information system that controls the electronic transmission of information from all sources in digital form. It collects, stores, processes and transmits information through a set of procedures, processes and technical means and techniques through a specific form of organized interaction and is made available to users across networks, meeting the basic requirements of the information system (Al-Maatham, 2010).

**Knowledge Economies:** they stand for economy which it is primarily based on the production, prevalence and use of knowledge and information (Al-Hashemi & Azzawi, 2007).

### *1.2 Limitations of the Study*

The study was limited to a sample of Jordanian universities students in the northern region, namely: Yarmouk, Jordan University of Science and Technology and Al Albayt for the academic year 2015/2016 since these universities have digital libraries.

The results of the study are also limited to the instrument used in this study to reveal the role of Jordanian digital libraries in enhancing the knowledge economy in Jordanian universities from the perspectives of students, taking into consideration that these instruments created and developed by the researcher.

## **2. Materials and Methods**

This part of the study includes a description of the methodology of the field study, its sample, population, the instrument used, validity, reliability, the instrument correction and variables and procedures. They are as follows:

### 2.1 Field Study Methodology

The current study follows the analytical descriptive approach. The analytical descriptive approach is the method that studies a phenomenon, event or issue that currently exists, and from which information can be attained that answers the study questions without the researcher's intervention.

### 2.2 Field Study Population and Sample

The sample of the study was randomly selected from all Jordanian universities students in the northern region, namely: Yarmouk, Jordan University of Science and Technology and Al al-Bayt for the academic year 2015/2016, where there are digital libraries in these universities. The sample was 370 students. The following table shows the characteristics of the sample population.

Table 1. Frequencies and percentages by study variables

	Categories	Number
Gender	Male	215
	Female	155
College	Humanities	220
	Scientific	150
Total		370

### 2.3 Study Instrument

In order to achieve the objectives of the study, the theoretical literature and previous studies were examined. A two-part questionnaire was developed to collect data from the sample members, as follows: Part 1: General information from the members of the study sample. Part 2: A questionnaire to reveal the role of Jordanian digital libraries in enhancing the knowledge economy in the Jordanian universities from the points of view of students, consisting of (19) items, and divided into three domains, namely: the domain of Research Accessibility in digital libraries, consisting of (7) items, the domain of producing knowledge, consisting of (6) items and the domain of putting knowledge into practice, consisting of (5) items.

### 2.4 Instrument Validity

The validity of the study instrument was confirmed in order to apply it to the sample of the study in two ways:

#### **First: External Validity:**

In order to verify the validity of the content of the study instrument, it was presented in its preliminary form to a group of experienced experts in learning technologies, libraries, information, educational management, measurement and evaluation, public administration and management information systems and the technology of education in Jordanian universities, where they were asked to express their opinions and observations on the relevance of the items to the domains in which they were included. In addition to the

coherence of the linguistic structure, clarity of meaning, easiness of understanding and any observations and amendments deemed appropriate, the questionnaire was re-edited based on the opinions of the experts. As for the instrument, and after examining it in its final form, it consisted of (20) items, and divided into three domains, namely: the domain of research accessibility in digital libraries, consisting of (7) items, the domain of producing knowledge, consisting of (6) items and the domain of putting knowledge into practice, consisting of (6) items.

## Second: Construct Validity

To verify the indicators of validity of construct of the study instrument, it was applied to a 30-student survey sample from outside the main sample of the study. The values of the correlation coefficients of the item were computed by the domain in line with the values of the correlation coefficients of the items in the instrument as a whole. The correlation coefficients of the items with the domains were high, ranging from 0.33 to 0.86, and correlation coefficients between items and instrument as a whole ranging from 0.30 to 0.73. It should be noted that a criterion has been adopted for the acceptance or deletion of any of the items in a way that its correlation coefficient is no less than the domain, and the instrument as a whole at 0.25. Accordingly, all items have been accepted as well as the values of the correlation coefficients among the study instrument domains, and between the domains and the instrument as a whole, were computed too. It was found that the values of the correlation coefficients for the instrument domains were high ranging from 0.73 to 0.91, while the values of correlation coefficients between domains and instrument as a whole ranged from 0.81 to 0.91.

### 2.5 Instrument Reliability

To verify the reliability of the study instrument, it was applied to a 30-student survey sample from outside the sample. The application was re-applied to the same sample in the *t*-retest method. After a two-week interval, the Pearson correlation coefficient was computed between their scores at both times on the scale as a whole, and the domains separately. The reliability coefficient was also computed in the internal consistency method, using Cronbach's Alpha formula for the domains, and the scale as a whole, as shown in Table 2:

Table 2. Cronbach's Alpha Coefficients - Measurement of Internal Consistency and *t*-Retest Reliability and Pearson Correlation Coefficient for the domains and instrument as a whole

Domain	<i>t</i> -Retest Reliability Pearson Correlation Coefficient	Internal Consistency Cronbach's Alpha
Research Accessibility	0.87	0.89
Producing Knowledge	0.84	0.89
Putting Knowledge into practice	0.89	0.87
The instrument as a whole	0.87	0.95

### 2.6 Instrument Study Rubric

The five-level Likert scale was applied to correct the study instrument, where the answer

Strongly Agree is given five scores, the answer Agree is given four scores, the answer Neither agree nor disagree is given three scores, the answer Disagree is given two and the answer Strongly disagree is given one score. The means were classified as follows: less than 2.5 degrees are low. From 2.5 - to less than 3.5 degrees are medium and 3.5 degrees and above are high.

### 3. Results and Discussion

Results of the first question: What is the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the perspectives of students?

To answer this question, the mean and standard deviation of the role of digital libraries in the enhancement of the knowledge economy in Jordanian universities were computed from the students' points of view. The table below illustrates this.

Table 3. The mean and the standard deviation arranged in descending according to the mean

Rank	Number	Domain	Mean	Standard Deviation	Function
1	1	Research Accessibility	3.63	.656	High
2	2	Producing Knowledge	3.33	.736	Medium
3	3	Putting knowledge into practice	3.28	.704	Medium
The Function as a Whole			3.33	.644	Medium

Table (3) shows mean and standard deviation of the role of Jordanian digital libraries in enhancing the knowledge economy in Jordanian universities from the points of view of students. The Research Accessibility came first with the highest mean of 3.63 with a large role, followed by putting knowledge into practice with mean of 3.33 with a medium role then the field of producing knowledge in third place with mean of (3.28), with a medium role. The mean for the function as a whole was (3.33), with a medium function. These results are inconsistent with Radwan's (2006) study which suggested that the role of information technology in the knowledge economy was high in universities. According to Al-Smadi's (2011), there was a medium degree of awareness of the students of Al-Balqa Applied University in the concepts of knowledge economy.

The mean and standard deviation of the estimates of the members of the study sample were computed on the items of the instrument, as follows:

#### **Domain One: Research Accessibility:**

The mean and standard deviation were computed for the estimates of the members of the study sample on the items of the domain of research accessibility, as follows:



Table 4. The mean and the standard deviation on the items of the domain of research accessibility arranged in descending according to the mean

No	Rank	Items	AM	SD	Function
5	1	Access to the same resources by large numbers of students.	3.85	1.006	Large
7	2	The digital library allows easy navigation between different information channels.	3.78	1.010	Large
3	3	Providing interactive services through a variety of technologies in support of library services and quality assurance.	3.76	1.005	Large
1	4	Providing data and information in various forms.	3.61	.952	Large
4	5	Availability of information resources in libraries in a way that suits the numbers of students.	3.48	1.093	Medium
6	6	Continuous updating of information channels, allowing access to new sources.	3.43	.946	Medium
2	7	Provides flexibility in the digital library with regarding when and where to access digital information sources.	3.39	.865	Medium

Table (4) shows the mean and standard deviation of the items of research accessibility, where Item (5), which states that “Access to the same resources by large numbers of students” came in first rank with mean of (3.85) and with a large function. Item 2, which states that “Provides flexibility in the digital library with regard to when and where to access digital information sources” came at the last rank with an mean of 3.39 and a standard deviation of (0.945) and with a medium function.

These results are consistent with Dvornik's (2004) who confirmed that the beneficiaries of digital libraries were satisfied with their use of the digital library. However, they need to introduce a larger quantity of full texts of information materials, to include more comprehensive topics rather than historical articles and works that are not subject to rights of Intellectual Property

## Domain 2: Producing Knowledge

Table (5) shows the mean and the standard deviation of the domains of producing knowledge, where Item (2), which states that “the digital library develops the skills of students' scientific thinking” is ranked first with an arithmetic mean of 3.39, that corresponds to estimates of the medium function, while item (4) which reads: “The digital library offers the possibility of producing, developing, storing and distributing knowledge” is ranked last with mean of 3.17, which corresponds to the estimates of the medium function. This result differs from the Parker's (2005) that indicated that a digital library encompasses a digital catalog containing information on how to use it to maximize access and get more uses of it, where the library is designed at a high organizational level.

Table 5. The mean and standard deviation of the domains of producing knowledge are arranged in descending according to the mean

No	Rank	Items	AM	SD	Function
2	1	The digital library develops students' scientific thinking skills	3.39	1.108	Medium
5	2	Digital libraries enhance individual learning to acquire knowledge more effectively	3.32	.907	Medium
1	3	The digital library helps to expand students' perceptions of challenges and problems	3.24	1.066	Medium
6	4	Digital libraries facilitate the follow-up of recent developments in different disciplines of students	3.21	.831	Medium
3	5	The digital library helps to expand students' perceptions of challenges and problems	3.19	.872	Medium
4	6	The digital library offers the possibility of producing, developing, storing and distributing knowledge	3.17	.872	Medium

### Domain 3: Putting Knowledge into Practice

The mean and standard deviation were computed for the estimates of the individuals in the study sample on the domains of putting knowledge into practice, and Table (6) shows this.

Table 6. The mean and standard deviation of the domains of putting knowledge into practice are arranged in descending order according to the mean

No	Rank	Items	AM	SD	Function
5	1	Digital libraries allow students to find solutions to society's social, economic and cultural problems	3.34	.892	Medium
4	2	The digital library helps to increase students' productivity in the university and in working life	3.31	.961	Medium
2	3	The digital library provides information channels linked to the students' life situations	3.28	1.002	Medium
1	4	Digital libraries provide systems and techniques that help students benefit from the experiences of others	3.22	1.035	Medium
3	5	The digital library helps to increase the efficiency of scientific students and enrich their professional experience	3.16	.890	Medium

Table (6) shows the mean and the standard deviation of the domains of putting knowledge into practice, where Item (5) states that "Digital libraries allow students to find solutions to society's social, economic and cultural problems" came in the first rank with an mean of 3.34, that corresponds to estimates of the medium function, while item (3) which reads: "The digital library helps to increase the efficiency of scientific students and enrich their professional experience" is ranked last rank with mean of 3.16, which corresponds to estimates of the medium function. This result is inconsistent with the Parker's (2005) which it revealed that a digital library is full of valuable educational resources and can be used in

classrooms.

**Results of the Second Question:** Are there statistically significant differences at the level of ( $\alpha \leq 0.05$ ) in the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the points of view of students according to the difference of variables of gender and college?

So as to answer this question, the mean and standard deviation of the role of digital libraries in the enhancement of the knowledge economy in Jordanian universities were computed from the students' perspectives according to the different gender and college variables.

Table 7. The mean and standard deviation of the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the points of view of students according to different gender and college variables

			Research Accessibility	PK	PKP	FAW
Gender	Male	AM	3.37	3.30	3.65	3.35
		SD	.79	.68	.62	.63
	Female	AM	3.26	3.25	3.59	3.30
		SD	.65	.74	.71	.66
College	Humanities	AM	3.39	3.33	3.61	3.37
		SD	.78	.69	.55	.61
	Scientific	AM	3.26	3.22	3.65	3.30
		SD	.69	.72	.74	.67

AM= Arithmetic Mean

SD= Standard Deviation

PK= Producing Knowledge

KU= Putting Knowledge into Practice

FAW= FunctionAs a Whole

Table 7 shows an apparent variance in the mean and standard deviation of the role of digital libraries in enhancing the knowledge economy in Jordanian universities from the points of view of students according to different gender and college variables. To illustrate the statistically significant differences among the mean, the two-way variance analysis was used on the domains, and Table (8) shows the variance analysis of the instrument as a whole.

Table (8) shows that there are no statistically significant differences at the significance level ( $\alpha = 0.05$ ) due to the impact of gender in all domains and there are no statistically significant differences ( $\alpha = 0.05$ ) due to the impact of college. This result is consistent with Radwan's (2006), which showed that there were no statistically significant differences in study participant assessments among the role of information technology in the knowledge economy due to gender. In parallel, Al-Smadi (2011) indicated that there were no statistically significant differences of awareness of the students of Al-Balqa Applied University in the concepts of knowledge economy due to the academic level and specialization variables.

Table 8. The two-way variance analysis of the impact of gender and the college on the domains of the role of digital libraries in enhancing the knowledge economy in Jordanian universities

Source of variance	Domains	Sum of squares	Degrees of Freedom(d f)	Mean-square value	F. Value	Statistical Significance
Job title	RA	.370	1	.370	.757	.385
Hotelling = .008	PK	.037	1	.037	.077	.782
H = .638	PKP	.324	1	.324	.789	.375
College	RA	.003	1	.003	.005	.941
Hotelling = .002	PK	.024	1	.024	.049	.824
H = .952	PKP	.109	1	.109	.265	.607
	RA	149.647	306	.489		
Error	PK	146.436	306	.479		
	PKP	125.608	306	.410		
	RA	168.240	311			
Total	PK	154.275	311			
	PKP	133.821	311			

#### 4. Conclusion

In this study, it is aimed to determine the role of digital libraries in enhancing the knowledge economy in Jordanian universities. It is concluded that digital libraries in Jordanian universities play important role in enhancing the knowledge economy from the students' point of view, but this role was generally medium. However, digital libraries in Jordanian universities play a major role in enhancing the knowledge economy in terms of Research Accessibility. While, digital libraries in Jordanian universities play a medium role in enhancing the knowledge economy in terms of employment and production of the knowledge. Therefore, attention must be given to strengthening this role.

#### 5. Recommendations

Based on previous results, the researcher recommends:

1. The results show that there is a medium role for the digital library in enhancing knowledge economics. In this regard, the researcher recommends that this role should be strengthened through academic in line with social seminars and awareness leaflets that contribute to raising students 'awareness of the importance of digital libraries and the need to use them effectively in academic and practical life as well;
2. The necessity of providing libraries with modern technologies in order to constantly update the information channels in the universities alongside other academic institutions; and
3. The need for conducting further studies on this subject through the application on other segments and comparing the results together to reach an integrated vision of the role of digital libraries in the service of knowledge economics.

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